

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-166283

(43)Date of publication of application : 23.06.1998

(51)Int.Cl.

B25F 5/02
B24B 23/00

(21)Application number : 08-330885

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(22)Date of filing : 11.12.1996

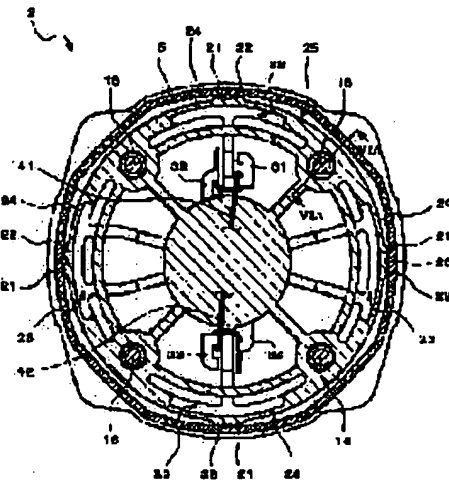
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(54) HANDLE POSITIONING MECHANISM FOR POWER TOOL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a positive click feeling, smoothly rotate a handle, and prevent the entanglement and breakage of connection liens when the handle is rotated and positioned on a mainbody.

SOLUTION: A handle 5 is rotatable against a mainbody 2, with four supporting protrusions 21, 22 and a protrusion 20 located on both connections. The protrusion 20 is fitted to the supporting protrusions 21, 22 to position the handle 5. The supporting protrusions 21, 22 are elastically formed with thin plates 24 to cause a click feeling when fitted with the protrusion 20. A connection space is formed between the mainbody 2 and the handle 5. When the handle 5 is rotated, no contact load is applied to the protrusion 20 and the supporting protrusions 21, 22. The mainbody has ribs 31, 32, 33, 34, on which connection lines 41, 42 from a motor are wound. The connection lines 41, 42 are connected through the rotational center of the handle 5 to a switch.



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[Date of request for examination] 10.09.1998

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3015311

[Date of registration] 17.12.1999

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right] 17.12.2003

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CLAIMS

[Claim(s)]

[Claim 1] It connects with the body section and the body section, and the body section is received. The pivotable handle section, The 1st fitting section which is a revolution positioning device over preparation *****, and was prepared in either a body or the handle section, It is prepared in another side of a body or the handle section, and is the 2nd fitting section which can fit into the 1st fitting section. It has the 2nd fitting section prepared corresponding to the revolution orbit of the 1st fitting section. Either [at least] the 1st fitting section or the 2nd fitting section is the handle section positioning device of the power tool which has elasticity and is characterized by what the 1st fitting section and the 2nd fitting section fit in, and positioning of the handle section to the body section is performed for based on the elasticity concerned.

[Claim 2] When it is formed near [one / at least] the 1st fitting section or the 2nd fitting section of sheet metal-like resin material in the handle section positioning device of the power tool concerning claim 1 and the resin material concerned bends, it is the handle section positioning device of the power tool characterized by what elasticity produces in the 1st fitting section or the 2nd fitting section.

[Claim 3] The handle section positioning device of the power tool characterized by what the connection space for not adding a contact load to the 1st fitting section and the 2nd fitting section is formed for in the handle section positioning device of the power tool concerning claim 1 when the amount of [of the body section and the handle section] connection rotates the handle section to the body section.

[Claim 4] The path cord which the motor is formed in the body section, and the switch section which controls actuation of the motor concerned is prepared in the handle section in the handle section positioning device of the power tool concerning claim 1, and connects a motor and the switch section electrically is the handle section positioning device of the power tool characterized by what is arranged so that it may pass near the revolution central point of the handle section to the body section, or the revolution central point concerned.

[Claim 5] The handle section positioning device of the power tool characterized by what it has the path cord attaching part which is a path cord attaching part prepared in the body section in the handle section positioning device of the power tool concerning claim 4, and is located between a motor and the handle section, and said path cord is held for at the path cord attaching part concerned.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the handle section positioning device of a power tool with the pivotable handle section especially to the body section of a power tool about the handle section positioning device of a power tool.

[0002]

[Description of the Prior Art] As a conventional example of a power tool, there is a grinder as shown in drawing 8 A and B. The abrasive disc 65 is formed at the head of the body section 62, and this abrasive disc 65 rotates in response to actuation of a motor. The handle section 64 is connected to the body section 62 back. As shown in drawing 8 B, the handle section 64 is constituted by the half-segmented sections 64A and 64beta. The body section 62 has the circular-sulcus section 67 in a part for a connection, and the handle section 64 has the annular projected part 68 in a part for a connection. When the annular projected part 68 engages with this circular-sulcus section 67, the body section 62 and the handle section 64 are connected.

[0003] As shown in drawing 8 A and drawing 8 B, near the annular projected part 68 of the handle section 64, the bolting screw 77 has penetrated, a locknut 78 is thrust into this bolting screw 77, and the half-segmented sections 64alpha and 64beta are connected. If the bolting screw 77 is bolted with a driver, the half-segmented sections 64alpha and 64beta will be fastened, the annular projected part 68 is pressed by inboard and engagement in the circular-sulcus section 67 becomes strong. By this, the physical relationship of the body section 62 and the handle section 64 can be held.

[0004] On the contrary, if the bolting screw 77 is loosened with a driver, handle section 64alpha and handle section 64beta can loosen, and, as for *****, the body section 62, and the handle section 64, the engagement of the annular projected part 68 and the circular-sulcus section 67 will become pivotable. The body section 62 is rotated in this condition, and the sense of an abrasive disc 65 is adjusted according to an activity situation.

[0005] When rotating the handle section 64 and adjusting the sense of an abrasive disc 65, spacing of 90 degrees is set and it can position by four places. Drawing 9 A and B is the view sectional views of the direction of IX-IX shown in drawing 8. In addition, drawing 9 B shows the cross section for a connection of handle section 64alpha and handle section 64beta.

[0006] As shown in drawing 9 A and B, upheaval 62T are formed in the body section 62, and hollow 64K are formed in the handle section 64 (handle sections 64alpha and 64beta). These hollow 64K set spacing of 90 degrees, and are formed in four places. When rotating the handle section 64 to the body section 62, upheaval 62T can fit into hollow 64K, and it can position by the feeling of a click by this fitting.

[0007] In this way, after rotating the handle section 64 and adjusting the sense of an abrasive disc 65, the bolting screw 77 is again inserted in a screw hole, it binds tight with a driver and the physical relationship of the adjusted body section 62 and the handle section 64 is fixed.

[0008]

[Problem(s) to be Solved by the Invention] There were the following problems in the above-mentioned conventional power tool. First, the handle section 64 is rotated to the body section 62, and when upheaval 62T shown in drawing 9 separate from hollow 64K, upheaval 62T press the inner skin of the

handle section 64 (handle sections 64alpha and 64beta). There is a problem that the handle section 64 cannot be smoothly rotated to the body section 62 by this contact pressure.

[0009] Although this contact pressure by upheaval 62T can be reduced if the swelling of upheaval 62T is made small, the feeling of a click by fitting of upheaval 62T and hollow 64K decreases, and the problem that positioning cannot be ensured arises.

[0010] Moreover, the motor for making the body section 62 drive an abrasive disc 65 is contained, and it connects with the switch section and the electric target which are prepared in the handle section 64. When rotating the handle section 64 to the body section 62, sag may arise in a path cord under the effect of this revolution, or a path cord may be pulled. When there is a possibility that a path cord may twine round a motor when sag arises in a path cord, and a path cord is pulled, there is a possibility that an open circuit etc. may arise.

[0011] Then, when rotating the handle section to the body section and positioning, this invention can obtain a positive feeling of a click, moreover can rotate the handle section smoothly, and aims at offer of the handle section positioning device of the power tool which can prevent a debt, an open circuit, etc. of a path cord further.

[0012]

[Means for Solving the Problem] The handle section positioning device of the power tool concerning claim 1 It connects with the body section and the body section, and the body section is received. The pivotable handle section, The 1st fitting section which is a revolution positioning device over preparation *****, and was prepared in either a body or the handle section, It is prepared in another side of a body or the handle section, and is the 2nd fitting section which can fit into the 1st fitting section. It has the 2nd fitting section prepared corresponding to the revolution orbit of the 1st fitting section. Either [at least] the 1st fitting section or the 2nd fitting section has elasticity, and based on the elasticity concerned, the 1st fitting section and the 2nd fitting section fit in, and are characterized by what positioning of the handle section to the body section is performed for.

[0013] In the handle section positioning device of the power tool which the handle section positioning device of the power tool concerning claim 2 requires for claim 1, it is formed near [one / at least] the 1st fitting section or the 2nd fitting section of sheet metal-like resin material, and when the resin material concerned bends, it is characterized by what elasticity produces at the 1st fitting section or the 2nd fitting section.

[0014] In the handle section positioning device of the power tool concerning claim 1, the handle section positioning device of the power tool concerning claim 3 is characterized by what the connection space for not adding a contact load to the 1st fitting section and the 2nd fitting section is formed for the amount of, when the amount of [of the body section and the handle section] connection rotates the handle section to the body section.

[0015] The handle section positioning device of the power tool concerning claim 4 In the handle section positioning device of the power tool concerning claim 1 in the body section The path cord connected electrically a motor and the switch section by forming the motor and preparing the switch section which controls actuation of the motor concerned in the handle section It is characterized by what is arranged so that it may pass near the revolution central point of the handle section to the body section, or the revolution central point concerned.

[0016] In the handle section positioning device of the power tool concerning claim 4, the handle section positioning device of the power tool concerning claim 5 is the path cord attaching part prepared in the body section, is equipped with the path cord attaching part located between a motor and the handle section, and is characterized by what said path cord is held for at the path cord attaching part concerned.

[0017]

[Effect of the Invention] In the handle section positioning device of the power tool concerning claim 1, the 1st fitting section is prepared in either a body or the handle section, and the 2nd fitting section is prepared in another side of a body or the handle section. And either [at least] the 1st fitting section or the 2nd fitting section has elasticity, based on the elasticity concerned, the 1st fitting section and the 2nd fitting section fit in, and positioning of the handle section to the body section is performed.

[0018] Thus, since either [at least] the 1st fitting section or the 2nd fitting section has elasticity, in case the handle section is rotated to the body section, it can mitigate the contact load by the 1st

fitting section or the 2nd fitting section, and can rotate the handle section smoothly. Moreover, in case the 1st fitting section and the 2nd fitting section fit in, the feeling of a click by elasticity can be obtained and positioning of the handle section to the body section can be checked clearly.

[0019] In the handle section positioning device of the power tool concerning claim 2, it is formed near [one / at least] the 1st fitting section or the 2nd fitting section of sheet metal-like resin material, and when the resin material concerned bends, elasticity arises in the 1st fitting section or the 2nd fitting section. Therefore, the 1st fitting section or the 2nd fitting section can be made to produce elasticity with a simple configuration.

[0020] In the handle section positioning device of the power tool concerning claim 3, when the amount of [of the body section and the handle section] connection rotates the handle section to the body section, the connection space for not adding a contact load to the 1st fitting section and the 2nd fitting section is formed in it.

[0021] Thus, in case the amount of [of the body section and the handle section] connection rotates the handle section to the body section, the contact load by the 1st fitting section or the 2nd fitting section can be mitigated to it, and it can be made to rotate the handle section smoothly, since connection space is formed.

[0022] In the handle section positioning device of the power tool concerning claim 4, the motor is formed in the body section and the switch section which controls actuation of the motor concerned is prepared in the handle section. And the path cord which connects a motor and the switch section electrically is arranged so that it may pass near the revolution central point of the handle section to the body section, or the revolution central point concerned.

[0023] Therefore, even if it rotates the handle section to the body section, the die length of the path cord between a motor and the switch section is almost fixed, and the sag of the path cord accompanying the revolution of the handle section or the tension of a path cord can be avoided. By avoiding the sag of a path cord, it can prevent that a path cord twines round a motor. Moreover, an open circuit of a path cord etc. can be prevented by avoiding the tension of a path cord.

[0024] In the handle section positioning device of the power tool concerning claim 5, it is the path cord attaching part prepared in the body section, and it has the path cord attaching part located between a motor and the handle section, and said path cord is held at the path cord attaching part concerned.

[0025] By holding a path cord at a path cord attaching part, the die length of the path cord between a motor and a path cord attaching part can be kept constant. The sag of a path cord or the tension of a path cord is certainly avoidable with this. By avoiding the sag of a path cord, it can prevent that a path cord twines round a motor. Moreover, an open circuit of a path cord etc. can be prevented by avoiding the tension of a path cord.

[0026]

[Embodiment of the Invention] A grinder is explained to an example for 1 operation gestalt of the handle section positioning device of the power tool concerning this invention. Drawing 1 and drawing 2 are the side elevations of the whole grinder in this operation gestalt. Drawing 3 is a side-face sectional view near the connection of the body section 2 and the handle section 5, and the view sectional view of the direction of IV-IV which shows drawing 4 to drawing 3, and drawing 5 are the view sectional views of the direction of V-V shown in drawing 3. Moreover, drawing 6 A is the view sectional view of the direction of VIA-VIA shown in drawing 4, and drawing 6 B and C is drawings showing the detail near projection 20 and the receptacle projections 21 and 22. Drawing 7 is a side-face sectional view near the connection of the body section 2 and the handle section 5, and is drawing showing arrangement of a path cord.

[0027] The motor 35 is built in the [outline of whole configuration] body section 2 (refer to drawing 7), and the revolution grinding stone 4 is formed at the head of the body section 2. And this revolution grinding stone 4 rotates in response to actuation of a motor 35. The handle section 5 is connected to the body section 2. Drawing 3 is a side-face sectional view near the connection of the body section 2 and the handle section 5. When the annular irregularity section 9 prepared in the annular irregularity section 8 prepared in the body section 2 and the handle section 5 is engaged, the body section 2 and the handle section 5 are connected as shown in drawing 3.

[0028] When the condition which it is pivotable and shows in drawing 1 is made into a criteria location

to the body section 2, the handle section 5 rotates a longitudinal direction 90 degrees, and can be positioned. Drawing 2 is in the condition of having rotated the handle section 5 rightward. Drawing 1 R> 1 is the case where the polish activity of an object is done using the revolution grinding stone 4, and drawing 2 is the case where use the revolution grinding stone 4 for a lengthwise direction, and cutting of an object is performed.

[0029] In addition, the handle section 5 is constituted by the two half-segmented sections divided into shaft orientations, and in this half-segmented section, as it puts the annular irregularity section 8 of the body section 2, it is connected. The two half-segmented sections are being fixed with the bolt 17.

[0030] The locating bolt 18 is formed in four places at the handle section 5. The locating bolt 18 is thrust into the nut 19 fixed to the body section 2 (drawing 6 A). The nut 19 is formed in the four body sections 2 at intervals of 90 degrees. When rotating the handle section 5 and switching the location to the body section 2, four locating bolts 18 are loosened, it removes from a nut 19, and the handle section 5 is rotated. And after positioning, a locating bolt 18 is fastened and a lump location is fixed.

[0031] The switch section 36 is built in the handle section 5 (refer to drawing 7), and the switch trigger 7 is formed further. By grasping the switch trigger 7, the switch section 36 is turned on, a motor drives, and the revolution grinding stone 4 rotates. Moreover, if the switch trigger 7 is released, the switch section 36 will become off and the revolution grinding stone 4 will suspend a revolution.

[0032] [the positioning device of the handle section 5] --- when rotating the handle section 5 and switching the location to the body section 2 as mentioned above, four locating bolts 18 are loosened and the handle section 5 is made into a pivotable condition. And the handle section 5 is rotated to the body section 2.

[0033] As mentioned above, since the location of the handle section 5 is fixed by thrusting four locating bolts 18 into the nut 19 fixed to four places of the body section 2 at intervals of 90 degrees, the handle section 5 needs to rotate accuracy 90 degrees. For this reason, a feeling of a click, i.e., a response, arises these 90 degrees in a location so that an operator can recognize that the handle section 5 rotated 90 degrees.

[0034] The structure for producing this feeling of a click is explained in full detail. As shown in drawing 4 , near the annular irregularity section 9 of the handle section 5, the projection 20 which is the 1st fitting section is formed. On the other hand, corresponding to the revolution orbit of this projection 20, the receptacle projections 21 and 22 which are the 2nd fitting sections are formed in the body section 2. The receptacle projections 21 and 22 are formed in four places at intervals of 90 degrees.

[0035] In addition, what is necessary is to rotate a longitudinal direction 90 degrees to the criteria location shown in drawing 1 , to position, and just to be able to switch the handle section 5 to three locations with this operation gestalt. For this reason, with this operation gestalt, three receptacle projections 21 and 22 are used among the receptacle projections 21 and 22 prepared in four places.

[0036] The space 23 for elasticity is formed in the tooth-back side of the receptacle projections 21 and 22, this space 23 for elasticity will receive and projections 21 and 22 will be located on the sheet metal section 24. And at least, since this sheet metal section 24 part consists of resin material, the receptacle projections 21 and 22 bend inside and resiliency produces them.

[0037] As shown in drawing 6 B , when the projection 20 has fitted into the depression between the receptacle projections 21 and 22, the handle section 5 is positioned to the body section 2, and can thrust four locating bolts 18 into each nut 19 in this condition (drawing 6 A).

[0038] It is drawing 6 C which shows the condition of the projection 20 at the time of loosening and removing a locating bolt 18 and rotating the handle section 5, and the receptacle projections 21 and 22. Projection 20 receives, projection 21 is pressed, and the sheet metal section 24 bends inside, and projection 20 is received and overcomes projection 21. In this way, popularity is won, fitting with projections 21 and 22 is solved, and projection 20 will be in the condition which can be rotated freely.

[0039] As shown in drawing 4 , the connection space 25 is formed between the body section 2 and the handle section 5. In case the handle section 5 is rotated by forming this connection space 25, a contact load is not added to projection 20 and the receptacle projections 21 and 22. For this reason, the handle section 5 can be rotated smoothly.

[0040] When the handle section 5 is rotated about 90 degrees, projection 20 contacts the adjoining receptacle projection 22 (receptacle projection 22 of the upper part in drawing 4). When the

projection 20 contacted this adjoining receptacle projection 22, a load arises in the handle section 5 which was rotating smoothly till then, and an operator recognizes that the handle section 5 approached the revolution location 90 degrees.

[0041] And by winning popularity with projection 20 and rotating the handle section 5 succeeding against a load with projection 22, the sheet metal section 24 bends inside and the receptacle projection 22 is depressed according to the rotation of projection 20. By this, projection 20 is received and fits into the depression between projections 21 and 22. By the feeling of a click in the case of this fitting, an operator judges that rotational positioning was performed 90 degrees, suspends revolution actuation of the handle section 5, fastens four locating bolts 18, and fixes a location.

[0042] [Arrangement of path cords 41 and 42], next wiring of path cords 41 and 42 which connects a motor 35 and the switch section 36 electrically are explained. As shown in drawing 4, in the body section 2, the ribs 31, 32, 33, and 34 as a path cord attaching part are formed. In drawing 4, ribs 31 and 32 are located upward and ribs 33 and 34 are located downward. In addition, the rib 31, a rib 32 and a rib 33, and the rib 34 are formed in the condition of having shifted in a completely different class mutually.

[0043] As shown in drawing 7, two path cords 41 and 42 with which the motor 35 contained by the body section 2 is equipped are twisted around ribs 31 and 33, respectively. It sets like the assembler of this grinder, path cords 41 and 42 are twisted around ribs 31 and 33 in the condition of having made the body section 2 and the half-segmented section by which the handle section 5 was divided separating, and path cords 41 and 42 are held with ribs 31 and 33. Moreover, you may hold by hooking path cords 41 and 42 on ribs 31 and 33. Under the present circumstances, it is twisted from a motor 35 before ribs 31 and 33 so that sag may not arise in path cords 41 and 42.

[0044] The path cords 41 and 42 twisted around ribs 31 and 33 are bundled by one, and are connected to the switch section 36 in the handle section 5. Then, the body section 2 is put in the half-segmented section by which the handle section 5 was divided, the two half-segmented sections are fixed with the above-mentioned bolt 17, and the handle section 5 is connected to the body section 2.

[0045] In addition, for the sake of the convenience like an assembler, generally, there are allowances in the die length of path cords 41 and 42, and when the body section 2 and the handle section 5 are connected at this rate, sag will arise in path cords 41 and 42. With this operation gestalt, path cords 41 and 42 are twisted around ribs 31 and 33 as mentioned above. For this reason, path cords 41 and 42 do not curtain in the spacing L1 shown in drawing 7, and the sag of path cords 41 and 42 is produced in the handle section 5.

[0046] Since path cords 41 and 42 do not curtain in spacing L1, path cords 41 and 42 do not twine round a motor 35. Moreover, since the die length of the path cords 41 and 42 in spacing L1 can be kept constant, path cords 41 and 42 are not pulled by the revolution of the handle section 5, and an open circuit of path cords 41 and 42 etc. can be prevented.

[0047] With this operation gestalt, as mentioned above, ribs 31 and 32 are located upward and ribs 33 and 34 are located downward (refer to drawing 4). Moreover, the rib 31, a rib 32 and a rib 33, and the rib 34 are formed in the condition of having shifted in a completely different class mutually.

[0048] Therefore, a rib can be chosen according to the class of motor and a path cord can be twisted around a suitable location. That is, the location and number of a path cord may change with classes, and a motor can choose a rib according to the situation. For example, what is necessary is just to twist 3 Motome's path cord around either of the ribs 32 and 34 shown in drawing 4, when path cords are three motors.

[0049] Moreover, as shown in drawing 7, the path cords 41 and 42 bundled by one are arranged through handle section feed-hole 5H of the handle section 5. These handle section feed-hole 5H are formed near the revolution central point of the handle section 5. Since path cords 41 and 42 pass along handle section feed-hole 5H by this operation gestalt, even if it rotates the handle section 5 to the body section 2, the die length of the path cords 41 and 42 between a motor 35 and the switch section 36 is almost fixed.

[0050] Therefore, the sag of the path cords 41 and 42 accompanying the revolution of the handle section 5 or the tension of path cords 41 and 42 is avoidable. It can prevent that path cords 41 and 42 twine round a motor 35 by avoiding the sag of path cords 41 and 42. Moreover, an open circuit of

path cords 41 and 42 etc. can be prevented by avoiding the tension of path cords 41 and 42. Moreover, with this operation gestalt, in order to bundle two path cords 41 and 42 to one and to let handle section feed-hole 5H pass, an assembly and decomposition become easy.

[0051] In the [other operation gestalt] above-mentioned implementation gestalt, although the grinder was explained to the example, this invention is not limited to this, and if the handle section is a pivotable power tool, it is applicable [this invention] to other tools to the body section. Moreover, although the projection 20 was illustrated as the 1st fitting section, popularity was won as the 2nd fitting section and projections 21 and 22 were illustrated, if fitting is possible, other configurations and structure are employable [it is prepared corresponding to the revolution orbit top, and] as the 1st fitting section and the 2nd fitting section.

[0052] Furthermore, although the sheet metal section 24 received and elasticity is given to projections 21 and 22 with the above-mentioned operation gestalt, this invention is not limited to this, may be received by using a flat spring, a coil spring, etc. for example, and may give elasticity to projections 21 and 22. Moreover, elasticity can be given to a projection 20 side instead of the receptacle projections 21 and 22, or elasticity can also be given to the both sides of the receptacle projections 21 and 22 and projection 20.

[0053] Moreover, with the above-mentioned operation gestalt, although ribs 31, 32, 33, and 34 were illustrated as a path cord attaching part, this invention may adopt other configurations, structure, and other arrangement, as long as it is not limited to this and located between a motor and the handle section. Furthermore, although four ribs were illustrated, three or less or five ribs or more may be prepared.

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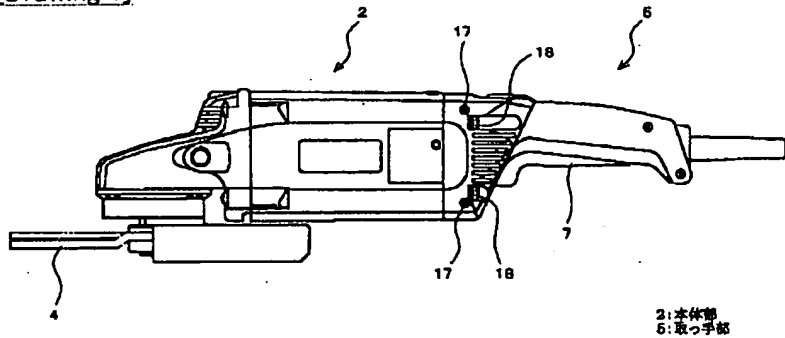
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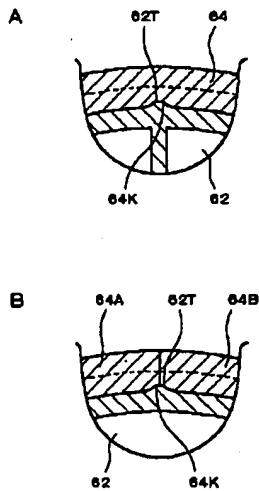
DRAWINGS

[Drawing 1]

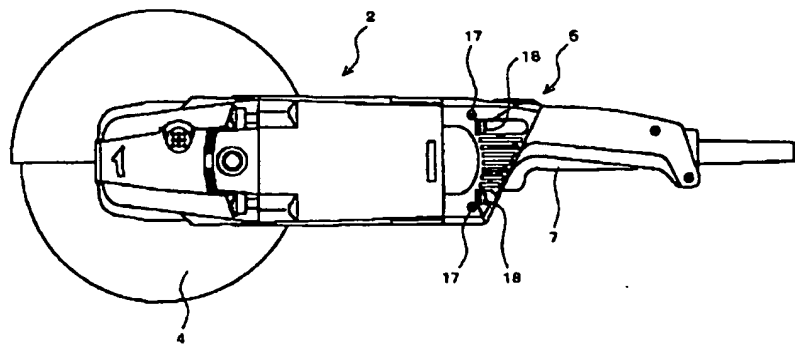


[Drawing 9]

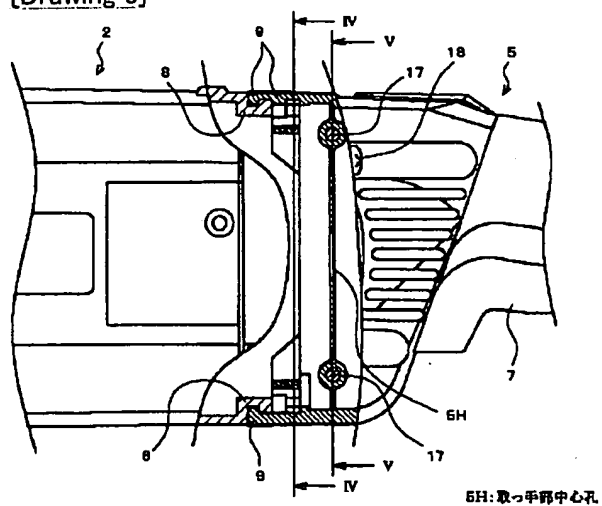
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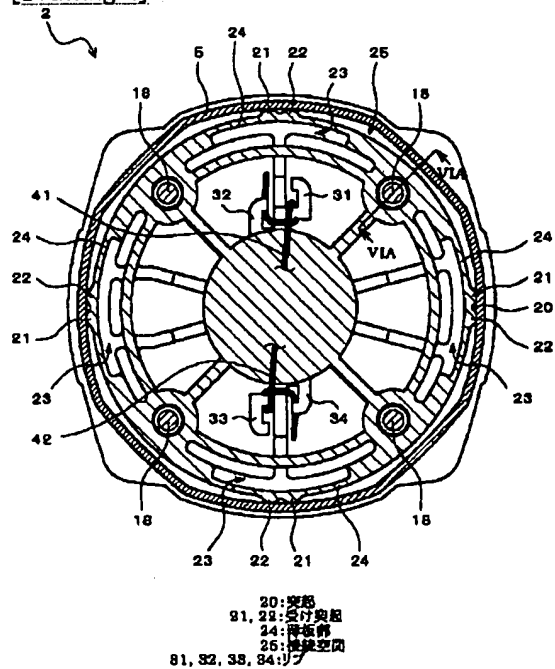
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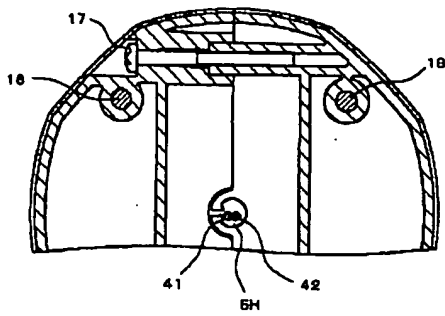
[Drawing 3]



[Drawing 4]

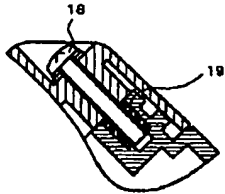


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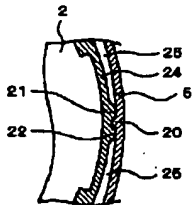


[Drawing 6]

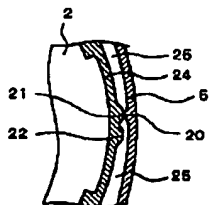
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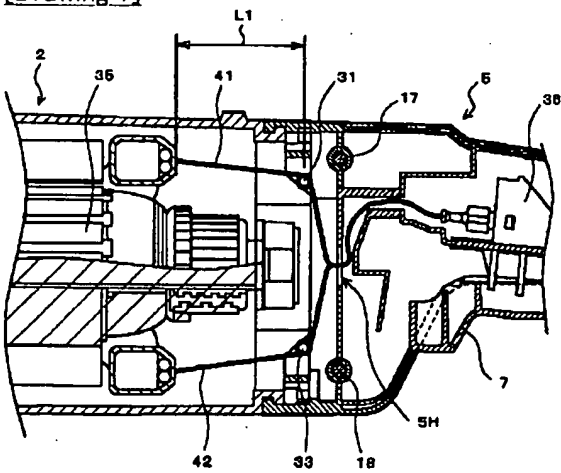
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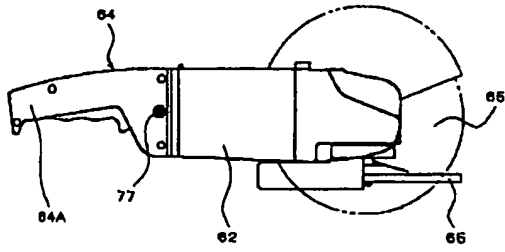
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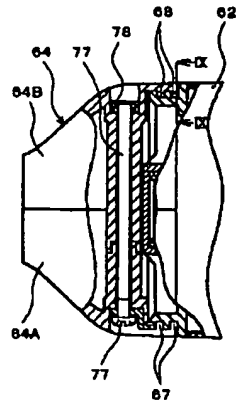
[Drawing 8]

(従来例)

A



B



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